

AMENDMENTS TO THE CLAIMS

Listing of Claims:

1. (Previously presented) A process for the production of polyunsaturated fatty acids in an organism comprising
 - (a) introducing, into the organism, at least one nucleic acid comprising the sequence shown in SEQ ID NO: 16 which codes for a polypeptide with lysophosphatidic acid acyltransferase activity; or
 - (b) introducing, into the organism, at least one nucleic acid comprising a nucleic acid sequence having at least 95% identity with the sequence of SEQ ID NO: 16, wherein the nucleic acid codes for a polypeptide with lysophosphatidic acid acyltransferase activity, or
 - (c) introducing, into the organism, at least one nucleic acid which codes for a polypeptide comprising the amino acid sequence shown in SEQ ID NO: 17 or comprising an amino acid sequence having at least 95% identity with SEQ ID NO: 17 and has lysophosphatidic acid acyltransferase activity, and
 - (d) culturing and harvesting the organismwherein the organism is a microorganism, yeast, or a plant.
2. (Previously presented) The process for the production of polyunsaturated fatty acids according to claim 1, wherein, additionally to the nucleic acid sequence mentioned under (a) to (c), further nucleic acid sequences which code for polypeptides of the fatty acid metabolism or lipid metabolism selected from the group consisting of acyl-CoA dehydrogenase(s), acyl-ACP[=acyl carrier protein] desaturase(s), acyl-ACP thioesterase(s), fatty acid acyltransferase(s), acyl-CoA:lysophospholipid acyltransferase(s), fatty acid synthase(s), fatty acid hydroxylase(s), acetyl-coenzyme A carboxylase(s), acyl-coenzyme A oxidase(s), fatty acid desaturase(s), fatty acid acetylenase(s), lipoxygenase(s), triacylglycerol lipase(s), allene oxide synthase(s), hydroperoxide lyase(s) and fatty acid elongase(s) were introduced into the organism.

3. (Previously presented) The process for the production of polyunsaturated fatty acids according to claim 1, wherein, additionally to the nucleic acid sequences mentioned under (a) to (c), further nucleic acid sequences which code for polypeptides selected from the group consisting of acyl-CoA:lysophospholipid acyltransferase, Δ -4-desaturase, Δ -5-desaturase, Δ -6-desaturase, Δ -8-desaturase, Δ -9-desaturase, Δ -12-desaturase, Δ -5-elongase, Δ -6-elongase and Δ -9-elongase, were introduced into the organism.
4. (Previously presented) The process for the production of polyunsaturated fatty acids according to claim 1, wherein the polyunsaturated fatty acids produced are C₁₈-, C₂₀-, C₂₂- or C₂₄-fatty acids.
5. (Previously presented) The process for the production of polyunsaturated fatty acids according to claim 1, wherein the polyunsaturated fatty acids are isolated from the organism in the form of an oil, a lipid or a free fatty acid.
6. (Previously presented) The process for the production of polyunsaturated fatty acids according to claim 1, wherein the polyunsaturated fatty acids produced in the process are C₁₈-, C₂₀-, C₂₂- or C₂₄-fatty acids.
7. (Previously presented) The process for the production of polyunsaturated fatty acids according to claim 1, wherein a polyunsaturated fatty acid selected from the group consisting of dihomo- γ -linolenic acid, arachidonic acid, eicosapentaenoic acid, docosapentaenoic acid and docosahexaenoic acid is produced in the process.
8. (Cancelled)
9. (Previously presented) The process for the production of polyunsaturated fatty acids according to claim 1, wherein the organism is a transgenic plant.
10. (Previously presented) The process for the production of polyunsaturated fatty acids according to claim 1, wherein the transgenic plant is an oil crop plant.
11. (Previously presented) An isolated nucleic acid comprising a nucleic acid sequence selected from the group consisting of:

- (a) the nucleic acid sequence shown in SEQ ID NO: 16,
- (b) a nucleic acid sequence having at least 95% identity with the sequence of SEQ ID NO: 16 and coding for a polypeptide having lysophosphatidic acid acyltransferase activity,
- (c) a nucleic acid sequence encoding a polypeptide comprising the amino acid sequence shown in SEQ ID NO: 17, and
- (d) a nucleic acid sequence encoding a polypeptide comprising an amino acid sequence having at least 95% identity with the sequence of SEQ ID NO: 17 and having lysophosphatidic acid acyltransferase activity.

12-14. (Cancelled)

15. (Previously presented) The isolated nucleic acid of claim 11, wherein the nucleic acid sequence originates from a eukaryote.

16. (Cancelled)

17. (Previously presented) A gene construct comprising the isolated nucleic acid of claim 11, where the nucleic acid is linked functionally to one or more regulatory signals.

18. (Previously presented) The gene construct of claim 17, wherein the nucleic acid construct comprises an additional biosynthesis gene of the fatty acid metabolism or lipid metabolism selected from the group consisting of acyl-CoA dehydrogenase(s), acyl-ACP[= acyl carrier protein] desaturase(s), acyl-ACP thioesterase(s), fatty acid acyltransferase(s), acyl-CoA:lysophospholipid acyltransferase(s), fatty acid synthase(s), fatty acid hydroxylase(s), acetyl-coenzyme A carboxylase(s), acyl-coenzyme A oxidase(s), fatty acid desaturase(s), fatty acid acetylenase(s), lipoxygenase(s), triacylglycerol lipase(s), allene oxide synthase(s), hydroperoxide lyase(s) and fatty acid elongase(s).

19. (Previously presented) The gene construct of claim 17, wherein the nucleic acid construct comprises an additional biosynthesis gene of the fatty acid metabolism or lipid metabolism selected from the group consisting of acyl-CoA:lysophospholipid acyltransferase, Δ -4-

desaturase, Δ -5-desaturase, Δ -6-desaturase, Δ -8-desaturase, Δ -9-desaturase, Δ -12-desaturase, Δ -5-elongase, Δ -6-elongase and Δ -9-elongase.

20. (Previously presented) A vector comprising the nucleic acid of claim 11 or a gene construct comprising said nucleic acid.

21. (Previously presented) A transgenic organism comprising the nucleic acid of claim 11, wherein the organism is a microorganism, yeast, or a plant.

22. (Cancelled)

23. (Previously presented) The transgenic organism of claim 21, wherein the organism is a plant.

24-26. (Cancelled)

27. (Previously presented) A transgenic organism comprising the gene construct of claim 17, wherein the transgenic organism is a microorganism, yeast, or a plant.

28. (Previously presented) A transgenic organism comprising the vector of claim 20, wherein the transgenic organism is a microorganism, yeast, or a plant.

29-30. (Cancelled)

31. (Previously presented) The nucleic acid of claim 11, wherein the nucleic acid sequence comprises the sequence of SEQ ID NO: 16.

32. (Previously presented) The nucleic acid of claim 11, wherein the nucleic acid sequence encodes a polypeptide comprising the amino acid sequence of SEQ ID NO: 17.